

Interactive comment on “MAgPIE 4 – A modular open source framework for modeling global land-systems” by Jan Philipp Dietrich et al.

Anonymous Referee #1

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The manuscript reflects an impressive effort: taking an existing model and turning it into a framework while meeting the demanding requirements of open sourcing it (licensing, distribution, documentation, and so on). The manuscript is a well-structured overview of the MAgPIE 4 framework.

In places, the manuscript can benefit from clarification and polish:

page1_line8: The abstract lists "flexible detail in process dynamics" as a feature. In the main text this phrasing does not recur, and it is unclear what it refers to: adjustable temporal resolution? Otherwise? Modify to bring the abstract in harmony with the content.

page2_lines29-30 "It also means that the complexity of a module realization can be

C1

chosen based on the importance of this component for the given question". I presume this refers to the freedom of choosing between different realizations of a module, picking one with a degree of complexity sufficient for the task at hand. If so, the phrasing is incorrect since "the complexity of a module realization" is fixed and hence can not be chosen. Rephrase.

page3_lines6 The sentence starting with "An output" is confusing. Suggestion: The main text is completed by an output section – showing some select model output and a specific use case of the spatial flexibility provided by the framework – as well as a conclusions and outlook section.

page8_lines17-18 Imply that the modularity is implemented in GAMS: "The inner layer written in GAMS (...) including the code modularity implementation". As explained in appendix A, the modularity is in part enabled by a naming convention as GAMS lacks name spaces, and in part by R code to check that the naming convention is adhered to. This extends beyond what GAMS provides. Moreover, it is the reviewers understanding that further R functionality is used to compose the chosen module realizations written in GAMS to a single GAMS source file. As such, it is inaccurate to imply that the modularity is implemented in GAMS. Rather the modularity results from extending GAMS with a naming convention and R helper code. Please reflect this in the text. Some words on the composition would also be welcome: much emphasis is put on the modularity of the framework, so the text should reflect it accurately and completely.

page8_line21 "a physical separation of the respective model code". Presumably this is meant to reflect the organization of the model code in directories and files. If so, using the word physical here obfuscates the matter, and is not accurate given the many layers of indirection between logical and physical storage in modern computing systems. Suggestion: "a hierarchical organization of the respective model code"

page9_line3 "Physically a module..." Similar concern as above. Suggestion: "A module in MAgPIE is represented as a folder..."

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page10_section3.5 discusses the model evaluation. Specifically, line 9 mentions "The automatized model evaluation documents currently validate". As written, this suggests that the documents are automatized and perform validation. From the preceding text, it is clear that instead the PDF evaluation documents are automatically generated, in principle allowing for human evaluation, though, at 2000 pages, practice is unlikely to reflect principle. Rephrase. Suggestion: "The automatically generated model evaluation documents currently allow comparison of about 1,000 output variables with reference data".

page13_line4- The paragraph discusses a revised setup emphasizing Brazil, but reducing the number of clusters elsewhere. It seems implied, but is not explicitly stated, that this serves to keep resource usage tractable or constant. This paragraph can benefit from clarification and more lucid phrasing.

page15_fig5/page13_lines11- Some words on the causative mechanisms for the marked outcome difference between the default and Brazil setup would be welcome.

Correction suggestions for spelling/syntax/punctuation:

page1_line5 computationally intensive page3_line27 region-specific page5_line1 choose a regional aggregation, with the country level () as the highest... page5_lines4&5 food-demand page8_line28 realizations page9_line25 The model outcomes at the cluster level page9_line27 data pre-processing at ISO country or 0.5 degree level page13_line4 less -> fewer page16_line11 and other research institutions, as enabled by

Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2018-295>, 2018.